

# *Virtual Solar Observatory (VSO) status and plans*



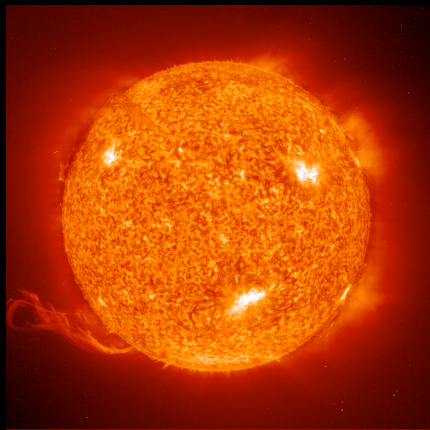
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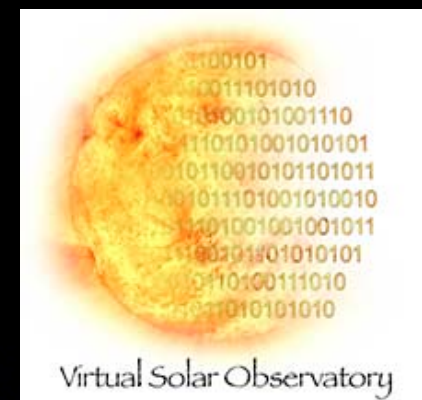
*Facility Scientist, Solar Data Analysis Center (SDAC)*

*\*or maybe Heliophysics Division*



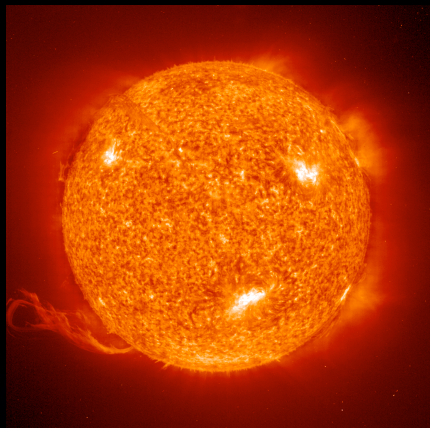


# Science constituency served



- Solar physicists
  - ▶ Not just US
  - ▶ Not just spacebased data users
- Other HPS researchers desiring access to solar data
  - ▶ Particularly heliospheric (*SOHO*, *STEREO*)
- Machines (*via API*)
- Not the general public
  - ▶ But possible to construct e.g. Java applet around API calls that could present data for the non-specialist



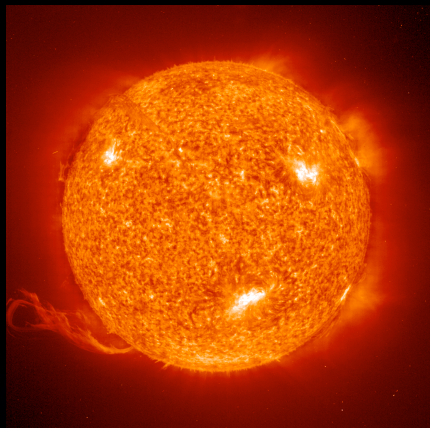


# Who does what



- Distributed development
  - ▶ Small teams (~ 0.1 FTE scientist, 0.1 - 0.5 FTE technically competent person) at:
    - Stanford
    - Montana State
    - SwRI (Boulder)
    - National Solar Observatory
    - Goddard
  - ▶ “Management” (rope pushing) at Goddard





# *Data sets available*



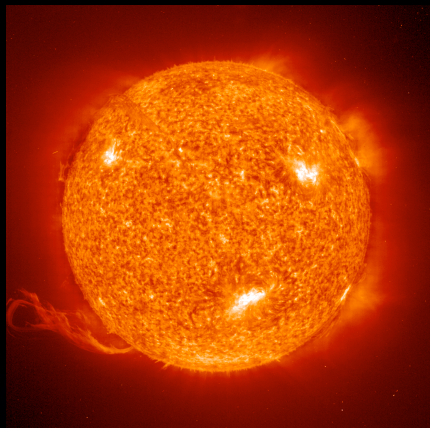
- Current

- ▶ 25 unique sources (spacecraft, groundbased observatories) at 12 providers
  - > 50 individual instrument-provider combinations
- ▶ 3 meta-metadata sets (event lists: CME's, flares)

- Planned

- ▶ New missions: STEREO, Solar-B, SDO
- ▶ Additional groundbased data sets (e.g. DOT)
- ▶ Additional event lists

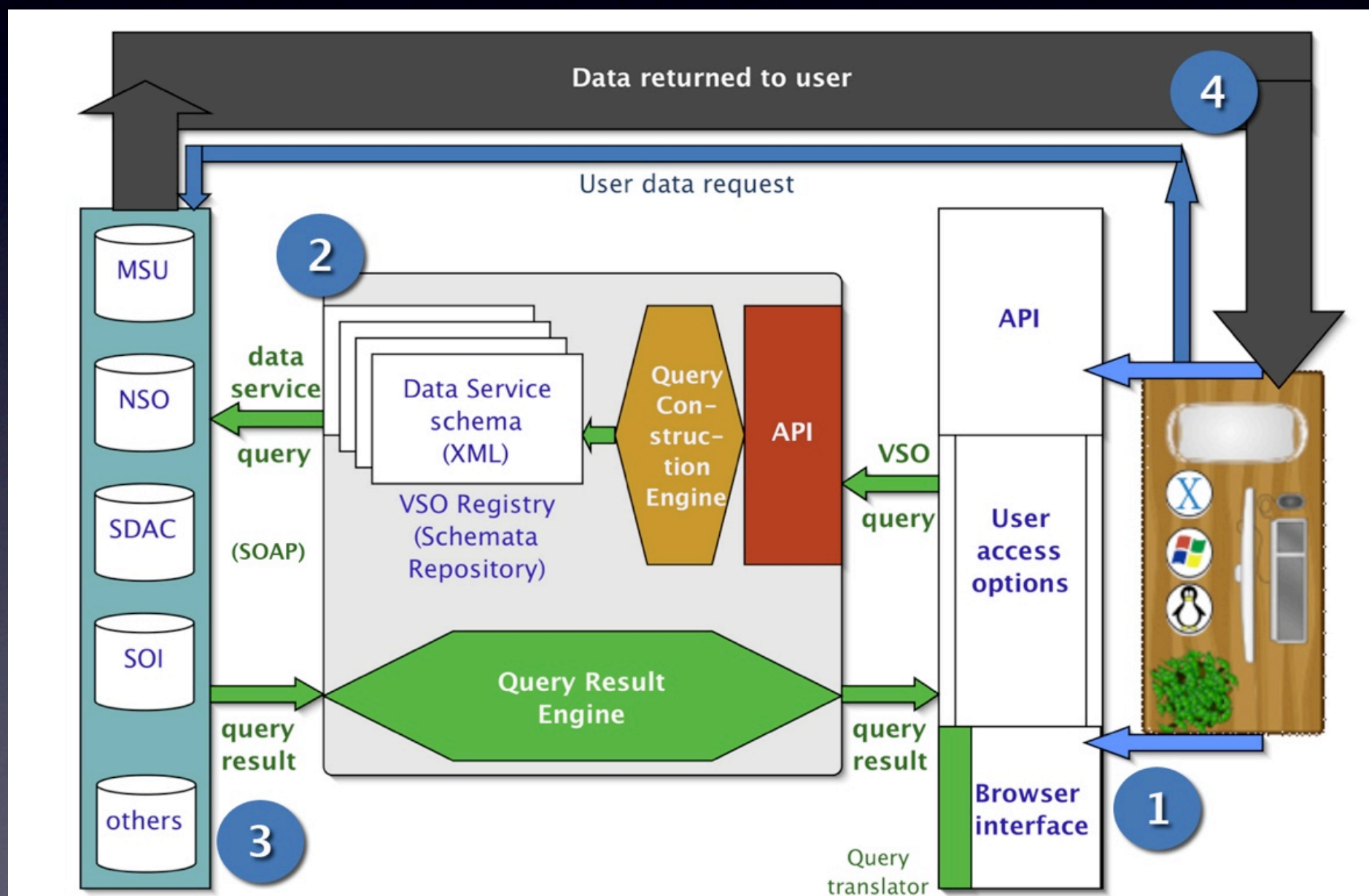




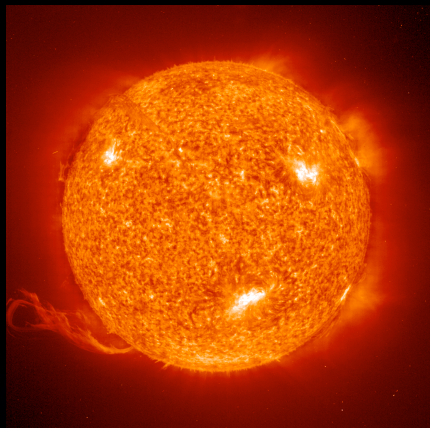
# Architecture



- The infamous “small box”





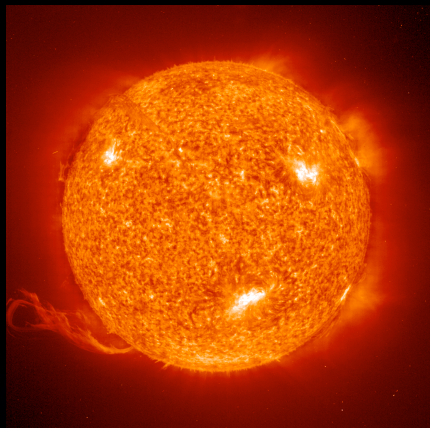


# Services



- Still mostly thinking inside the small box
  - ▶ Data query → meta data returned
  - ▶ Allows for iterative searches
  - ▶ Browser interface features
    - “Shopping cart” GUI
    - reorder columns, rows (Javascript)
    - thumbnails, images, animations
    - unique “cart ID” for reproducing searches
  - ▶ Don’t yet have links to software



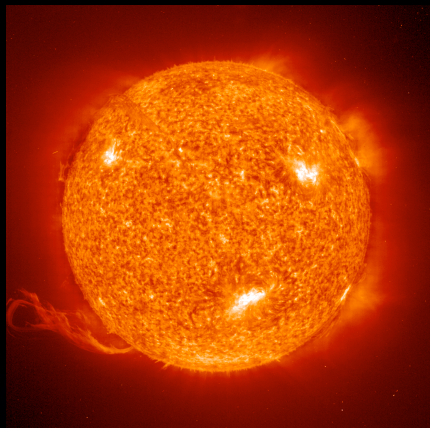


# Proposed new work (senior review)



- **Develop the full potential of the VSO**
  - Provide the ability to join searches on multiple catalogs/event lists and data sources
  - Provide ability to search on spatial regions/coordinate ranges of interest as well as time, &c.
  - Improve robustness/availability of VSO server instances
    - software recognition of when specific servers are unavailable
    - hardware for redundancy, failover
- **Work with other VO's on building a heliophysics meta-VO**
  - **Metadata translations**
  - **API change control, backwards compatibility**
  - Community planning efforts (e.g. NASA Heliophysics)
- Work toward making VSO compatible with semantic Web
  - Ontologies, Resource Description Framework (RDF)
  - Community efforts (e.g. AGU)
- Graphic User Interface (GUI) improvements
- Connections to applications packages (e.g. CoSEC)
- Establish database of carts, publications, and other user annotations
- Enable Cart ID's for API calls (to allow citation, statistics)
- Management (project management, communications with larger community and NASA management)



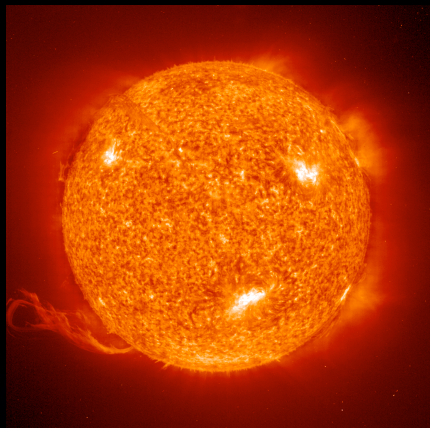


# Technology



- Service-oriented architecture
  - ▶ SOAP, WSDL
  - ▶ Browser interface as well as API
  - ▶ Only provider buy-in necessary is either a SOAP server or a proxy service at one of the “founding” providers (e.g. for ASCII flat-directory catalogs when no SQL db exists)
  - ▶ Based on VSO-unique data model
    - Queries are based on time and {physical observable, instrument, source, provider, spectral range, nicknames (common terms)}
  - ▶ New version of GUI will use VOTables (speed improvement, delivery option)



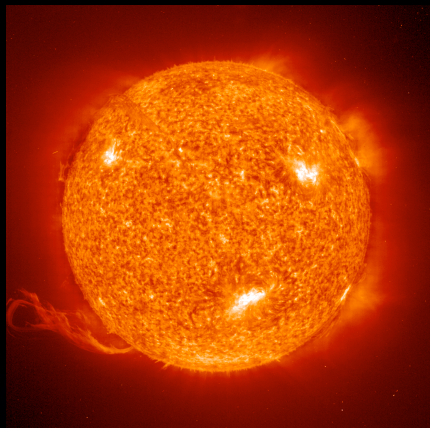


# *History (past and future)*



- Funded by SEC senior review, FY2001
  - ▶ Study (~ 1.3 year) produced strawman design, marketed at BoF sessions at AGU, SPD
- Development of initial capabilities: 2003/12 beta release, more consultation with community
- Additional functionalities, providers rolled out for AGU, AAS, SPD meetings since then (booth at 2005 Joint Assembly)

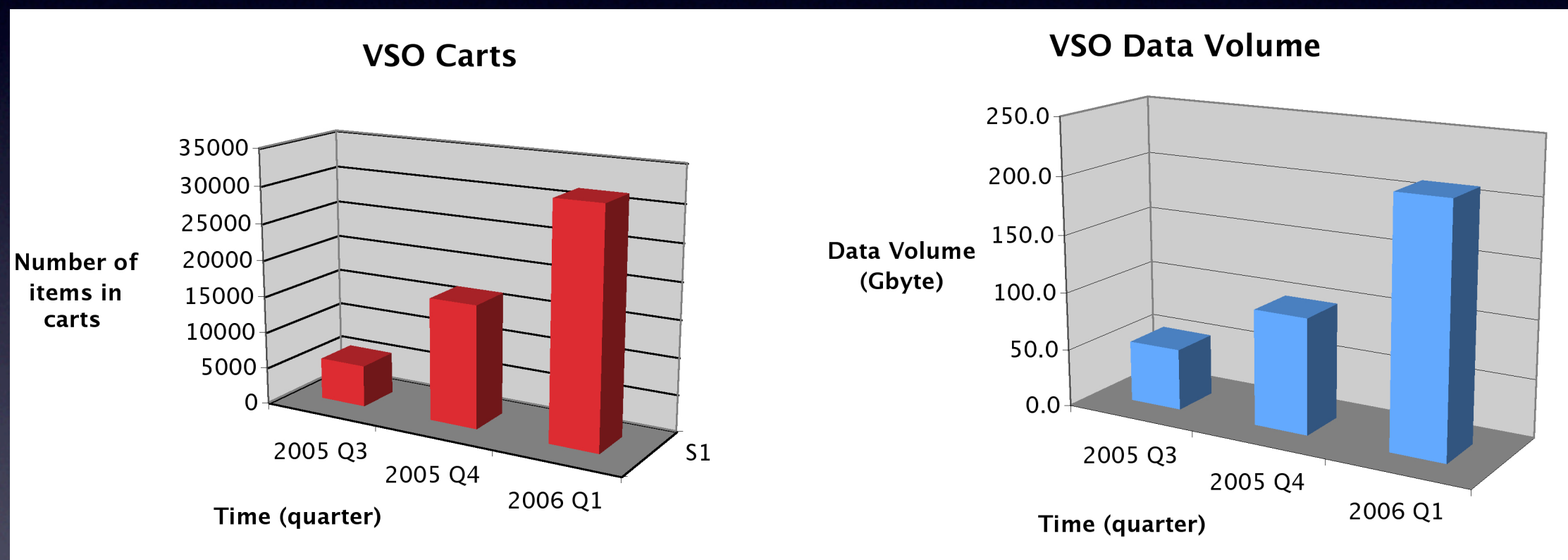




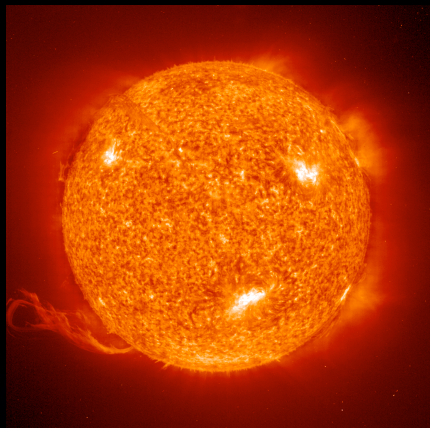
# Uptake



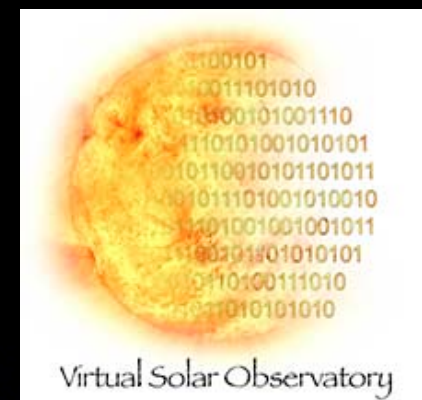
- Lies, damn lies, statistics, VO statistics....







# Methodology for user feedback



- VSO homepage solicits:
  - ▶ Suggestions for new features
  - ▶ Comments, criticisms, &c.
    - Go directly to ticketing system so s/w folks can deal with them
- Will continue to hold community (BoF) sessions
- Senior Review
  - ▶ Most recent: 2006 May 2
- Distributed development